

عنوان مقاله:

Intelligent Backstepping Controller Design to Maximize the Captured Power in a Wind Turbine System With Unknown Parameters

محل انتشار:

چهارمین کنفرانس بین المللی مهندسی برق ،الکترونیک و شبکه های هوشمند (سال: 1399)

تعداد صفحات اصل مقاله: 11

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خلاصه مقاله:

Conventional controllers need model parameters to generate control law, while these parameters may change, be uncertain, or be completely unknown. Therefore, designing a controller that is independent of model parameters will be very important. In this paper, all parameters of aerodynamic and mechanical model of wind turbine, are assumed to be unknown. Moreover, in many previous methods, for convenience in controller design, the two-mass model, which included three state variables such as rotor speed, generator speed and torsion angle, transformed to a model which included just rotor speed. Neglecting these two state variables in controller design, not only increases mechanical stress in wind turbine system but can also cause system instability. Therefore, in this paper, by employing neural network and state observer, an intelligent backstepping controller is designed for maximum power point tracking problem which can deal with these problems. The proposed control scheme utilizes the neural network to estimate unknown functions resulting from unknown system parameters. Furthermore, to remove the generator speed sensor and estimating unmeasurable torsion angle, a state observer is designed. To demonstrate the effectiveness and performance of proposed method, the controller is applied on a 600 KW wind turbine which the simulation confirm .the theoretical results

كلمات كليدى:

Wind Turbine System, Maximum Power Point Tracking, Inteligent Output Feedback Backstepping Controller

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